ABSTRACT

A momentum management system for attitude control of a spacecraft includes a housing to be fixed to the spacecraft and a momentum wheel rotor in the housing for storing angular momentum. A gimbal assembly mounts the rotor in the housing.

5 The rotor is driven by a drive with its output coupled to the rotor. A torque generation imparts torque to the rotor about axes orthogonal to the drive axis. The gimbal assembly includes a gimbal ring coupling the drive output to the rotor. The gimbal ring in turn includes flexure joints connecting the gimbal ring to the drive and the rotor. The flexure joints are configured to permit the rotor to tilt about two flexure axes

10 orthogonal to the drive axis to incline the rotor axis through a range of angles from about 0 degrees to about 7 degrees with respect to the drive axis under the control of said torque generation device. The preferred flexure joint is formed from two resilient, crossing webs. The webs have ring ends connected to the body of the gimbal ring and mounting ends connected to either the drive or the rotor. The system includes a

15 launch restraint system to limit movement of the rotor along the drive axis, including a stop mounted on the drive output and a cage mounted on the rotor, surrounding the stop. Under high acceleration, the cage engages the stop to support the rotor, relieving excess stress on the flexures of the gimbal suspension. The launch restraint system also includes deflection stops adjacent opposite sides of each web of each

20 flexure for limiting deflection of the webs.